DRAFT May 2017

PPCPs (Pharmaceuticals and Personal Care Products): **Carbamazepine**

Carbamazepine is a pharmaceutical (anticonvulsant) that works by reducing abnormal electrical activity in the brain. It is used alone or in combination with other medications to control certain types of seizures in patients with epilepsy. Carbamazepine is also used to treat mental illnesses, depression, posttraumatic stress disorder, drug and alcohol withdrawal, restless legs syndrome, pain syndromes, and chorea which affects children (Porter and Meldrum 2012).

From articles collected from the ECOTOX database in April 2016, there are 75 scientific articles related to effects of carbamazepine. The most common effects from carbamazepine are mortality and inhibited growth. The most sensitive taxa according to the literature are algae and freshwater plants.

Reported effects of carbamazepine from toxicity literature in the ECOTOX database (as of April 2016)

Aquatic Life	Reported Most Common effect(s)	Reported Common study endpoints	Reported Toxicity Value (LOEC, NOEC, EC50, LC50)
Clams/ Mussels	Toxicity, Stressors	Bioindicator, bioaccumulation, toxic effects	**IC50 (mg/L):** 24 h: 53.2 48h: 147.4 72h: 235.8 96h: 295.6 (Tsiaka 2013)
Fish	Effected growth, altered gene expression, Fecundity decline	Physiological effects, Chronic exposure	**72h (mg/L):** **NOEC:** 30.6 **EC50:** 86.5 **LC50:** >245 (Van der Brandhot 2010) **LC50:** >500 uM, EC50: 222 uM (Weigt 2011)
Crab/Shrimp	Toxicity, Inhibit Growth	Behavior responses,	**LOEC:** 0.010, **LC50:** 7.14×10−7, **EC50:** 7–165 (ug/L) (De Lange 2006)
African Clawed/Marsh Frog	Toxicity	Toxicity, hazard assessment	**EC50 (Alone):** 65.70 mg/L / **EC50 (Mixture):** 24h: 15.13, 48h: 12.47, 72h: 11.70, 96h: 10.99 (mg/L) (Melvin 2014)
Algae/ Freshwater Plants	Inhibit growth	Regeneration, Uptake	**EC50:** >81,000 µg·L–1 (Lawrence 2005)
Water Flea	Immobilization, No chronic effects reported	Chronic	**D. Magna:** (Immobilization): EC50: 24h: 475 uM 48h: 414 uM (Jos 2003)
Aquatic macroinvertebrates	Survival risk and inhibited growth at levels above environmental relevant conditions	Chronic exposure, Acute toxicity, Metabolic responses	**LC50 (redworm):** >1000 (ug/cm3) (McKelvie 2011) **From 20-23 degrees Celsius(bloodworm):** **NOEC:** 0.033-0.14**,** **LOEC:** 0.22-0.234**,** **EC50:** 0.16-0.28 **(mg/kg)** (Oetken 2005)

Porter, R.J. and B.S. Meldrum. (2012). Anti-seizure drugs *in* B.G. Katzung, S.B. Masters, A.J. Trevor, 12 Eds. Basic and clinical pharmacology. McGraw Hill. New York, NY, pp. 404-410.